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05.04.95 Bulletin 95/14(71) Applicant: **THE UNIVERSITY OF UTAH**
201 Biology Building
Salt Lake City,
Utah 84112 (US)(72) Inventor: **Gullberg, Grant T.**
789 E. Northcliffe Drive

Salt Lake City,
Utah 84103 (US)
Inventor: **Weng, Yi**
915 Medical Plaza
Salt Lake City,
Utah 84112 (US)

Inventor: **Zeng, Gengsheng Lawrence**
147 S. 1000 E. Apt. No.4
Salt Lake City,
Utah 84102 (US)

(74) Representative: **Pope, Michael Bertram**
Wingate
The General Electric Company, p.l.c.
GEC Patent Department
Waterhouse Lane
Chelmsford, Essex CM1 2OX (GB)

(54) **Imaging methods and apparatus.**

(57) Radiation passing through a cone beam collimator is received by a radiation detector (10) such as a gamma camera head, as the gamma camera head is moved in a helical orbit. Data $g(n,u,v)$ collected during the helical orbit is scaled (42) to scaled data $G(n,u,v)$. A first partial derivative $\partial G(n,u,v)/\partial u$ is taken (46u) with respect to a horizontal direction and a second partial derivative $\partial G(n,u,v)/\partial v$ is taken (46v) with respect to a vertical direction. The partial derivatives are linearly combined (48) by being multiplied by sine and cosine values of an angle α between the horizontal direction u and an arbitrary direction p in the detector plane to form partial derivatives $\partial G(n,u,v)/\partial p$. The coordinate system of the derivatives is converted (60) from the (n,u,v) coordinate system to an (n,α,p) coordinate system. The first derivatives are projected (62), i.e. summed row by row, onto a q axis which is perpendicular to the p arbitrary direction. The one-dimensional projection arrays are rebinned (70) to form first derivative Radon domain data $R'(\theta,p)$. A second derivative $R''(\theta,p)$ is taken (74) of the Radon domain data. The

second derivative Radon domain data is backprojected (80) into an image memory (82) and displayed on a video monitor (84).

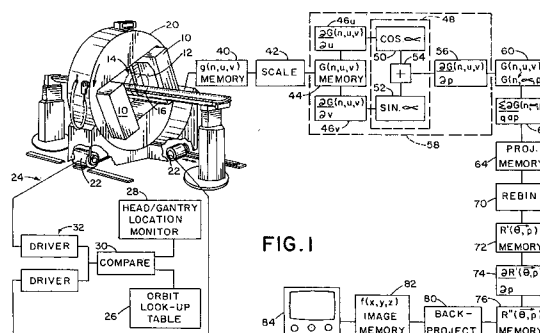


FIG. 1

EP 0 592 093 A3



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EUROPEAN SEARCH REPORT

Application Number
EP 93 30 6596

DOCUMENTS CONSIDERED TO BE RELEVANT					
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)		
A	PHYSICS IN MEDICINE AND BIOLOGY, vol. 37, no.3, March 1992 UK, pages 493-506, YAN ET AL. 'cone beam tomography with circular, elliptical and spiral orbits' * page 498, paragraph 4 * ---	1,9	G06F15/72		
A	EP-A-0 292 402 (COMMISSARIAT A L'ENERGIE ATOMIQUE) 23 November 1988 * claims 12-15; figure 10 * ---	1,9			
A	JOURNAL OF THE OPTICAL SOCIETY OF AMERICA A(OPTICS AND IMAGE SCIENCE), vol. 7, no.12, December 1990 USA, pages 2169-2183, KUDO ET AL. 'feasible cone beam scanning methods for exact reconstruction in three-dimensional tomography' ---				
A	TREZIÈME COLLOQUE SUR LE TRAITEMENT DU SIGNAL ET DES IMAGES, 16 September 1991 FR, pages 817-820, XP 000242901 GRANGEAT ET AL. 'recentes evolutions de la tomographie 3D en geometrie conique' * page 818, paragraph 2.2 * -----	1,9			
The present search report has been drawn up for all claims					
Place of search THE HAGUE		Date of completion of the search 3 February 1995	Examiner Perez Molina, E		
<table border="0"><tr><td>CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</td><td>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document</td></tr></table>				CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document	T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document
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